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RCL - ENVIRONMENTAL IMPACT

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Abstract

Since the cruise industry is accountable to pollute the oceans, marine wildlife and port cities, an environmental analysis was conducted of Royal Caribbean Cruises, Ltd (RCL) through “RCL – Environmental Impact”.

Cruise ships release very harmful gases which are responsible for damaging the ozone layer, increasing the risk of human diseases and greenhouse gases.

The shift to LNG powered vessels started in 2019 with prospects to proliferate to the entire cruise industry fleet in the long-run.

The environmental issues are a risk factor that can impact negatively the industry if cruise lines don’t take sustainable measures.

Keywords

Sulphur, Sustainability, Liquified Natural Gas (LNG), Environment

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Outlook

The cruise industry growth prospects are positive and settled to increase in the next years, especially with the adherence of younger travellers. According to the *Cruise Lines International Association (CLIA)*, generation Z is set to become the largest consumer generation by 2020, surpassing the Millennials. Although the forecasted extension in the customer base to a younger generation, ships are the most pollutant type of vacancy which also contributes to the destruction of marine wildlife. While the generation Z aspires to have diverse experiences and to travel all over the world, they are also more aware of the environmental issues that we currently live in, than the previous generations.[1] Hence, the cruise industry forecast is subject to this global trend of rebellion and environmental movements and also to a more conscious generation, which will have, in some years, the age of the average cruise ship passenger. Additionally, it is important to note the impact that social media and influence people have on matters of public opinion and the negative effect that one comment about the pollution derived from the cruise ships might have, especially among the younger generations.

How Cruise Ships Pollute the Environment

Cruise ships are also known as "floating cities" which accommodate thousands of people and offer a diverse number of amenities. Just like cities, these ships impact substantially coastal areas and port regions as well as oceans and marine life. Ocean cruise ships are responsible for at least 17% of all emissions of nitrogen oxide (NOx) in port cities and coastal areas[2]. Cruise vessels harmful disturb the environment through wasting sewage in the ocean and through air pollution, which in the end affect directly ports regions.

The substantial quantity of food and beverages consumed, besides all the water used on all

[1] Booking Global News. 2019. "Gen Z and the Future of Sustainable Travel." Accessed 1st December

[2] Simpson, M.C., Gössling, S., Scott, D., Hall, C.M. and Gladin, E. (2008) "Climate Change Adaptation and Mitigation in the Tourism Sector: Frameworks, Tools and Practices." UNEP, University of Oxford, UNWTO, WMO: Paris, France.

operations, have to go "somewhere", which ultimately, in the specific case of ships, might end up in the sea. Even the water dispensed by the toilet flush will end up on the ocean, contaminating the marine life. This **disposal of residuals** incorporates fecal matter, viruses and bacterias which are unsafe for the human health and aquatic life. According to the U.S. Environmental Protection Agency (EPA), a cruise ship with a capacity of 3,000 customers, can generate in a week about 795,936 liters of sewage. Additionally, the waste produced in the ships affects the resilience of the marine ecosystem, destroying corals and reefs.

Besides the marine life and ocean contamination, cruise ships are also responsible to pollute the **air we breathe**. These vessels burn a heavy fuel, which is considered the "dirtiest of fuel" and can lead to serious health problems, especially around port areas[3]. Even when the ships are moored, they still burn these fuels to provide electricity for the crew and clients. The burning process releases nitrogen oxides (NOx), sulphur (SOx) and other diesel particles harmful to human health. Although cruise lines are becoming more aware of the environmental issues, the vessels are becoming even larger, for instance, Royal Caribbean Cruises (RCL) Oasis of the Seas can carry 5,402 passengers.

The ***2019 Cruise Ship Report Card*** recently published by *Friends of Earth*, an international network of environmental organizations, classified the major cruise lines based on 4 environmental factors: Sewage Treatment, Air Pollution Reduction, Water Quality Compliance and Transparency. RCL received the highest grade on sewage treatment and a "D" grade regarding air pollution reduction.

European Scope

Although the pollution produced by cruise and transportation ships are a recurring issue in every region it will be specifically analyzed in Europe. Within the region, Spain, Italy, Greece, France

[3] Transport & Environment. 2019. "Luxury cruise giant emits 10 times more air pollution (SOx) than all of Europe's cars – study"

and Norway are the countries more affected by cruise ships' pollution[4].

Albeit Sulphur Emission Control Areas (SECAs), where regulations regarding sulphur fuel are more rigorous, there is still a lot of concern about air pollution emitted by the vessels. Moreover, these regulated areas are only located in the Baltic and Nordic Sea, concerning Europe and also in North America, leaving the Mediterranean zone uncovered. In 2017, RCL was the second largest cruise company pollutant in Europe, right after Carnival Corp, being estimated that emitted about 4 times more SOx than all the European Cars, according to the *European Federation for Transport and Environment*. This reflects the challenges and the potential to develop and enhance environmental standards within the cruise industry.

- Regulations

While sailing in SECAs, ships must only use 0.1% of sulphur compatible marine gas oil (MGO), while outside those areas, they must comply with a maximum of 1.5%, according to the **EU Sulphur Directive (2012/33/EU).** Concerning the global **MARPOL** (International Convention for the Prevention of Pollution from Ships) **Annex VI** and **EU Sulphur Directive**, cruise ships will have to switch to 0.5% sulphur compatible fuels while operating outside SECAs and outside berths, starting January 1st, 2020. Nonetheless, this directive is less strict than the **EU Berth Sulphur standard** of 0.1% in all European ports. Moreover, cruise ships built after 2021, will have to activate NOx control devices while sailing in NECA (North Sea and Baltic Sea Sulphur Emission Control Areas). Until the cruise fleets are replaced with less pollutant technologies, such as Liquified Natural Gas (LNG), the old vessels are being installed with scrubbers, which partially removes contaminant matter. However, this equipment is costly and not as beneficial as LNG. Notwithstanding, LNG is still a finite fossil fuel, although less pollutant, it still emits greenhouse gas.

[4] Transport & Environment. 2019. "One Corporation to Pollute them All: Luxury air emissions in Europe"

Royal Caribbean, Ltd Environmental Measures

Currently, RCL is taking environmental measures in order to reduce their carbon footprint and to preserve the marine wildlife, which are conducted by a Marine Advisory Board of experts[5]. At the moment, the company is buying more sustainable products by eliminating plastic straws, by substituting bulbs with LED, reducing the water consumed per customer, installing high-efficiency appliances such as ice maker that consume less water, low-flow showerheads and by re-using clean condensate water from ships' air conditioning units in laundry areas[6]. Moreover, RCL is investing in lower emission ships, for instance, the company's newest vessel *Symphony of the Sea*s is 25% more efficient than the older ship within the same class. Regarding the vessels who use current fuels, it is installed a scrubber which contributes to comply with environmental regulations. Another key measure taken by the company is through a gas cleaning or *Advanced Emissions Purification* (AEP) system, that treat gases emitted by the ship's generators by injecting water in it. This process can help to reduce 98% of SOx emissions and particulate matter (PM) but nonetheless, can't eliminate the NOx.

Environmental Impact on Royal Caribbean Cruises, Ltd

Considering the future impact of the environmental issues described above, can negatively affect RCL valuation if the company doesn't attempt to find solutions to an even "greener" sailing. Although regulations are getting stricter, there's yet a possibility of narrowing, even more the standards already imposed, in order to be a more sustainable industry. The next "green" trend and challenge is shifting fuel powered ships to LNG powered ones. Carnival Corp currently has the first ship completely fueled by LNG at port and sea and RCL has 2 vessels with the same technology on order, one of them entering in service in 2022.

LNG is way cleaner than heavy fuel oil since it doesn't release SOx and emits less than 90% of

[5] Morningstar Document Research. 2019. *Form 10-K: Royal Caribbean Cruises LTD – RCL*
[6] 2018. RCL Sustainability Annual Report

NOx emissions than the latter[7]. The main advantages are the lower costs of the fuel, the considerable reduction in harmful gases and the least severe erosion of the machinery. On the downside, there's obviously the construction of new vessels adapted to LNG whose tanks are significantly bigger, the lack of facilities to fuel the ships and the use of diesel if the LNG engines fail. Hence, in order to quantify the environmental impact on RCL, some scenarios were considered:

Scenario 1: Decreasing 10% of Fuel Operating Expenses and Fuel Swaps. Since LNG is cheaper than heavy fuel oil, it was considered a 10% decrease in the fuel price as proxy. Instead of heavy fuel oil, the company will be subject to fluctuations in the price of natural gas. Hence, in the same proportion, it was reduced the position of the company in the swap agreements.

Scenario 2: Increase in 10% of the company's CAPEX since incorporates *ships improvements*, *hardware and software updating* and *fleet expansion*.

Scenario 3: Combination of Scenario 1 and 2.

Scenarios	Share Price	EV	Gross Margin	% change
Base Case	$ 139,60	$ 42 754 579	41,80%	0%
Scenario 1	$ 145,75	$ 44 049 798	42,74%	3%
Scenario 2	$ 137,25	$ 42 384 970	41,80%	-1%
Scenario 3	$ 144,53	$ 43 857 387	42,74%	3%

Table 1: Results from the scenario analysis described

By applying Scenario 1, it is possible to observe that a 10% decrease in the fuel expenses and swap position can increase 3% of RCL's value, *ceteris paribus*.

With the increase of 10% in the company's CAPEX by upgrading the fleet and its technologies, it decreases RCL's value in 1%. Scenario 3 combines both scenarios by decreasing fuel expenses and increasing company's CAPEX which resulted in a positive 3% change compared to the base scenario applied to the valuation. However, in the long-run, as fleets are upgraded and becoming more efficient, the cruise operating costs will decrease considerably. Nonetheless, technology keeps evolving at a fast pace and hence the cruise industry must continue to make considerable investments in this area, in order to improve sea sustainability.

[7] Berglund, Carl. 2018. "*How will the Maritime industry deal with the 2020 Sulphur Regulations*" Accessed 15th December